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ABSTRACT

This paper focuses on four studies of pupils' reading comprehension completed at the University of Alberta. A number of investigators have described the acquisition and use of connectives by pupils and have indicated the importance of connectives in the development of abstract logical thinking. (Teachers often consider these words too simple to teach in reading classes except as sight words.) One of the author's concerns was the identification of connectives in three series of basal readers widely used in Canada at the upper elementary school level and an investigation of the understanding children have of them in reading. The amount of subordination produced by children eight to 12 years of age ranges from 10 to 30 percent of their total sentences with the amount increasing from year to year, but their basal readers use connectives in about 37 percent of the sentences and the amount is almost constant from grade to grade. (Forty two connectives were identified.) As important as this task of description and explanation of oral and written English language patterning may be to educators, the investigations cannot be restricted to language matters only but must encompass the interaction between reading and the logical development of pupils. (AMM)

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THE INFLUENCE OF CONNECTIVES ON READING COMPREHENSION

Many of the difficulties pupils encounter when reading the printed word are associated closely with their intellectual development and with their language. The child's logical development is assisted and facilitated by his language and one way of expressing logical relationships is through the employment of grammatical forms of language which permit conjoining and subjoining, the clause. The linguistic form that connects the clause to another clause or some work in it on the printed page is the connective. These are the familiar "ifs--ands--and buts" and other function words like them. This paper will focus on four studies completed at the University of Alberta which investigated pupils' reading comprehension. Two studies in particular report the contribution to reading comprehension of descriptions of written language by both structural and transformational generative grammar systems.

A number of investigators have described the acquisition and use of connectives by pupils and have indicated the importance of connectives in the development of abstract-logical thinking (Piaget, 1928; Warner and Kaplan, 1963; Vygotsky, 1934). Researchers recently reported on the development of these forms in the oral language of English speaking pupils (Menyuk, 1969; Katz and Brent, 1968). Katz and Brent explored the extent to which the child understands connectives which he uses spontaneously by analyzing samples of speech in terms of three levels of understanding.

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They reported that from ages 6 - 7 to 11 - 12 there is a "marked increase both in (a) the ability clearly to verbalize causal and temporal relationships, and the manner in which they are related by connectives, and (b) the preference for linguistic order of clauses to mirror the temporal order of events." They further commented that with the results showing a consistent progression without inversions on the three levels of understanding, this kind of differentiation can provide a reasonable subtle developmental index of linguistic control.

Other researchers have investigated the development of clauses and their connectives in the written language of children by comparing the sentence structure of deaf and hearing children (Heider and Heider, 1940) and by comparing the written language with the oral language of school-age children (Harrell, 1957). Equal concern has been evident in the research reports of others (Davis, 1941; Hunt, 1965). Although their findings have been helpful in understanding how young people use connectives in their oral and written language, more needs to be known about how well they can follow the author's thoughts expressed in his written language. In the reading situation, the pupil-reader cannot choose the adult-author. Children in their pre-school and elementary school years develop a commendable understanding of oral and written language patternings which may or may not be adequate in a particular reading situation where they are forced to receive the author's message through the language resources he has.

Ruddell (1963) established that the more similar the written language patterns were to the oral language patterns of the reader, the higher was the reading comprehension of that child. For this reason, some support the language experience approach to reading in which a concrete experience of the child is expressed as an oral language experience and is recorded in written form. Gradually the child obtains sufficient skill to read about his own experience recorded in his language patterns and eventually about the experience of others in their language patterns.

However, as the pupil learns to write for himself easily, this more permanent form allows him to plan and edit his thoughts, and his written language becomes more dissimilar to his oral language. Also, as he reads more widely, the more flexible use of language patterns by mature writers extends his reading knowledge of language further. This vital interaction between people is in the words of Rawson a "catalyst of cognitive change" (1965, p. 13). The interaction between reader and author and in an instructional situation, the interaction among teacher, student and author require interchange of information and a modification of the child's familiar cognizing operations.

The essential role of language in the development of thinking is established. Children use language symbols to think with and as they learn to manipulate they should include both a grammatical and logical manipulation of symbols. What this could mean was investigated by Rawson (1965, p. 44) who pointed out that if a language user operates within the rules of grammar he may communicate, but beyond this there is a possibility of logical operations performed by means of the language to achieve new knowledge, to make decisions, and to store information efficiently. For example, in these three sentences,

1. The truck is smaller than the ball.
2. The ball is smaller than the box.
3. Therefore, the truck is smaller than the box.

children may read sentences 1 and 2 and not realize that they could complete the logical operation of sentence 3.

Authors writing for younger readers in elementary schools usually use a wider selection of language patternings and have a better understanding of meaning attached to words, and children reading their books may not understand their more mature language structures and thinking processes. The problems of cognitive development, therefore, and the concomitant problems of oral and written language development pervade problems in reading. Four studies which provide

insights into reading problems of young people concerning clauses and their connectives have been completed at the University of Alberta under the supervision of Dr. Marion D. Jenkinson (Fagan, 1969; Rawson, 1965, 1969; Robertson, 1966).

One concern of my own study was the identification of connectives in three series of basal readers widely used in Canada at the upper elementary school level and an investigation of the understanding children have of them in reading (Robertson, 1966). The amount of subordination produced by children aged eight to twelve ranges from 10 to 30 per cent of their total sentences with the amount increasing from year to year but their basal readers use connectives in about 37 per cent of the sentences children read, and the amount is almost constant from grade to grade. Forty-two connectives were identified. Some of them (for example: and, but, when, and if) were used frequently in children's speech but others (for example: yet, although, however, and thus) were used more often by adults particularly in their written language.

To test pupil understanding of connectives the construction of test items comparable to those of the basal readers involved the description of the syntactical structure of more than 900 sentences containing connectives by phrase structure analysis (Mellon, 1964). This analysis described some of the sentences which authors had written yielding information about the forty-two connectives and their distribution both by reader series and by grade levels, the structural features of both main and subordinate clauses, and the types of sentences. Even though the phrase structure analysis did give much information about the clauses the authors had written, it did not explain how these sentences had been generated from their bases, and vital information about the sentence complexity and the author's writing style was not available. It was recommended in the suggestions for further research, therefore, that an analysis of sentences from basal reader instructional materials should be undertaken using transformational-generative grammar.

This task was undertaken by Fagan (1969) in a doctoral dissertation completed

four months ago in which he investigated under the framework of transformational-generative grammar the number and types of transformations found in the written language of three basal reader series at the grade four level and the difficulty these structures presented for pupils aged nine to twelve in grades four, five, and six. Anticipating a review of this research by the author in a forthcoming convention reference will be restricted to brief comments about two of the five categories into which the forty-three types of transformational rules were divided, the categories of embedding and conjoining. The remaining three categories were deleting, simple, and position shift. The presence of the embedding transformations tended to be the best predictor of sentence and passage difficulty with the type of embedding transformations rather than their number determining the difficulty of various written language structures. One of the transformations which consistently correlated with passage reading difficulty over grade levels was the relative clause. This and other findings confirmed and elucidated many interesting aspects of problems children have reading clausal structures. A further analysis of the data to give additional descriptions of clauses is being considered.

Both studies provided pupils with the opportunity to write in their own connections to ideas presented to them in written language and they responded by associating ideas with a wide range of language structures other than clauses. At times the pupils went to considerable trouble to change the written format of sentences given them so their preferred language structures could be incorporated. But pupils cannot choose their own language patternings when they read. They must be able to follow the language structure alternatives the authors choose.

The research studies of Quirk and Davy (1965-68), Ratekin (1965), and others are making available information about the present usage and with an equal focus on the written and spoken manifestations of English are informing teachers about possible structural differences in types of writing. Ratekin used a transformational model of grammatical analysis to determine if structural differences existed

between the fields of writing in history and chemistry. He cited some subject differences but concluded that author differences rather than subject differences would often explain structural differences in tests. Both research reports included comments about clausal structures.

There is, then, a growing number of studies which provide educators with a more precise description and explanation of the way both student-readers and adult-writers use English clauses and their connectives.

As important as this task of description and explanation of oral and written English language patternings may be to educators the investigations cannot be restricted to language matters only but must encompass the interaction between reading and the logical development of pupils. Rawson (1965) identified the bases of this interaction and considered the effect of these interactions on reading comprehension and on progress in logical thinking. A second study completed by her last year and reported at this convention explored the relation between children's ability to reason logically concerning concrete experiences and their ability to reason in reading, and to consider the role of reading in the on-going intellectual development of nine and ten year old children (Rawson, 1969).

One of the three interrelated areas in the logical development of the children associated with the development of reading comprehension in the initial study was that of the development of relations within language statements and between statements (causal, temporal, and the relation of implication). Distinguishing between causal relations and relations of implication she cited investigations to indicate that young children tend to offer causal rather than logical explanations (pp. 92-93). After the child learns a number of class relations (the relations of a member of a class to a class, as in "The sparrow is a bird ") he adds the important relations of class inter-section in which the child is able to "generate a new class whose intensive properties are the properties common to both of them (page 95)". In the sentence, "Children were allowed to go who had obtained their parents'

permission and had earned the money for the trip", the class of children who had earned the money for the trip are conjoined by the word "and" to give the new class of children who both had permission and had earned the money.

When these sentences are read, difficulties in comprehension may rest with the small word logical operators, the connectives. The words themselves as words will not present language difficulties but the mental operations required by the words may. Rawson further reminded teachers that they often consider these words too simple to teach in reading classes except as sight words (page 109). Without instruction children are likely to misinterpret a sentence in which a new class has been constructed by using words like "and--or" when the function of these words is not clarified. They may conclude if the function of the word "and" has not been clarified that if the child had either permission or money he would be allowed to go.

In her further study Rawson (1969) observed a lag between the acquisition of operations in reasoning in concrete and in reading situations at the upper elementary school levels at the time when the transformation of intelligence from the specific and the concrete to the abstract and formal level of functioning was taking place. The bridge from one to the other would seem to be the printed symbol. Once again the logical operators, the small function words called connectives, were essential to reading comprehension.

Even though comments on only one problem in reading comprehension have been attempted in this paper, the contribution of language analyses is acknowledged. To translate the findings of research studies into action in reading comprehension instruction remains an even greater challenge.

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